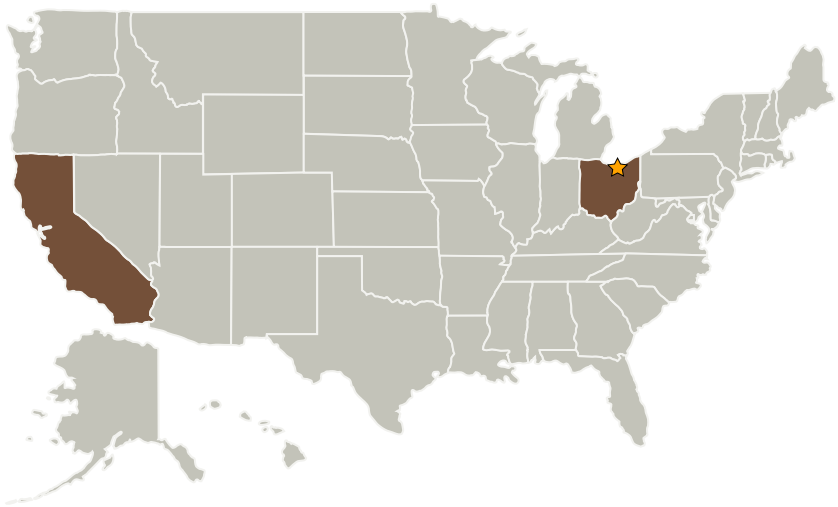
# Integration of an Advanced Cryogenic Electric Propulsion System (ACEPS) to Aerodynamically Efficient Subsonic Transport Aircraft, Phase I

Completed Technology Project (2009 - 2009)

## Project Introduction

This proposal defines innovative aerodynamic concepts and technology goals aimed at vehicle efficiency for future subsonic aircraft in the 2020 -- 2030 timeframe. Noise, emissions and fuel burn are all vehicle efficiency concerns which can be addressed by aerodynamic concepts either on the component, subsystem, or aircraft design system level. In line with the NASA, an assumption is made that by 2025, higher air traffic demand (2-3 times the 2004 level) will require a significant increase in airport throughput, improved air traffic control procedures, and a significant decrease in noise. Empirical Systems Aerospace (ESAero) has a design and analysis team to address high risk/high pay-off technologies on the aircraft aerodynamics concept level and airframe/propulsion integration to dramatically reduce noise, pollution, and fuel burn in the 2020-2030 timeframe. The key technology for these breakthroughs is the use of an advanced cryogenically-cooled electric propulsion system installed in advanced unconventional aircraft configurations. An important feature of this study is to understand and evaluate the impact of this propulsion system on the design and aerodynamic performance of the total aircraft. In addition, ESAero will examine the applicability of STOL performance to potential improvements in airport throughput using multiple configuration and aerodynamic performance concepts.

## Primary U.S. Work Locations and Key Partners

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| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| ★Glenn Research Center(GRC) | Lead Organization | NASA Center | Cleveland, Ohio |
| Empirical Systems Aerospace, Inc.(ESAero) | Supporting Organization | Industry | Pismo Beach, California |

| Primary U.S. Work Locations | |
|---|---|
| California | Ohio |

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Center / Facility:**

Glenn Research Center (GRC)

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

## Technology Areas

**Primary:**

- TX01 Propulsion Systems
  - TX01.3 Aero Propulsion
    - TX01.3.1 Integrated Systems and Ancillary Technologies